Guide to Preparing an EA Registration Document for Pit and Quarry Developments in Nova Scotia

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NOVA SCOTIA
Environment and Labour
Environmental and Natural Areas Management Division
Environmental Assessment Branch

OVERVIEW

Purpose

Environmental assessment (EA) is a planning and decision-making tool used to promote sustainable development. By predicting and evaluating the environmental effects of an undertaking before it begins there is the opportunity to mitigate potential impacts of the undertaking on the environment. For the public, this process ensures public resources and ecosystem functions are protected; for the proponent, this promotes better project planning, ultimately saving time and money.

The purpose of this guide is to provide consistency and a greater degree of certainty regarding the information submitted to register a pit or quarry undertaking for environmental assessment in Nova Scotia. This guide is not intended to impose strict information requirements or document structure for EA registrations but rather to give direction on the type and level of detail of information needed by the Nova Scotia Department of Environment and Labour (NSDEL) to make sound decisions. NSDEL requires a complete description of the proposed undertaking, its related activities, and the environment surrounding the proposed undertaking (refer to Appendix C for definition of environment). Proponents with thoroughly prepared registration documents are less likely to be required by the Minister to submit additional information once the environmental assessment process has begun.

The issues addressed in this guide are those typically associated with pit and quarry developments; however, there may be project specific issues that the proponent needs to address in the registration document that have not been identified in the guide. Similarly, there may be issues outlined in this guide that are not relevant to the project. Project-specific information will vary according to project type, location, and the surrounding environment, and it is the responsibility of the proponent to ensure that this information is submitted as part of the registration. For more information on pit and quarry developments, please refer to the list of reference material in Appendix A.

Before registering an undertaking for environmental assessment, proponents are encouraged to also refer to *A Proponent's Guide to Environmental Assessment* for non-sector-specific information about environmental assessment and the proponent's role during an assessment. Contact the EA Branch (Appendix B) or visit the EA Branch website (www.gov.ns.ca/enla/ess/ea) to obtain a copy of this guide.

Pit and Quarry Developments that Require Environmental Assessment

Nova Scotia's *Pit and Quarry Guidelines* define a pit as "An excavation made for the purpose of removing aggregate without the use of explosive". A quarry is "An excavation, requiring the use of explosives, made for the purpose of removing consolidated rock from the environment".

All pits and quarries in Nova Scotia are expected to meet the *Pit and Quarry Guidelines* (1999). The Environmental Assessment Regulations require that the proponent of "a pit or quarry in excess of 4 ha in area primarily engaged in the extraction of ordinary stone, building or construction stone, sand, gravel or ordinary soil" must register it for environmental assessment as a Class I undertaking before commencing work on the undertaking. A modification, extension, abandonment, demolition or rehabilitation of an existing pit or quarry may also be

required to register for environmental assessment. Proponents should contact the EA Branch to determine if an EA is required.

Pit and Quarry Developments that do not Require Environmental Assessment

An environmental assessment is not required for pits and quarries established solely to provide fill or aggregate for road building or maintenance contracts with the Nova Scotia Department of Transportation and Public Works (NSTPW). The NSTPW shall ensure these pits and quarries are operated in accordance with all applicable guidelines and regulations.

As well, an environmental assessment is not generally required for pits and quarries under 4 ha in size. The size of the pit or quarry includes associated works (e.g. buildings, structures, processing facility, pollution abatement system, stockpiles) and roadways constructed for the operation.

Please refer to Appendix C for the definitions of key terms associated with pit and quarry developments and environmental assessment.

Minimum Requirements

When preparing a registration document for a Class I undertaking, the proponent must ensure that certain project description information is included in the document. The undertaking will not be officially registered until the proponent submits all of the required information. Under Section 9(1) of the Environmental Assessment Regulations, a registration document must include, as a minimum, the following information:

- the name of the undertaking (should be descriptive of the project);
- the location of the undertaking (civic address, city, county);
- the name, address and identification of the proponent including the name of the Chief Executive Officer and contact persons;
- the nature of the undertaking;
- the purpose and need for the undertaking;
- the proposed construction and operation schedules (time frames, hours of operation);
- a description of the undertaking;
- a list of approvals which will be required and other forms of authorization; and
- sources of any public funding.

When preparing the registration document, the proponent also must address the factors relevant to the Minister's decision and other information detailed below.

Factors Relevant to the Minister's Decision

> NSDEL and its Minister need a complete description of the proposed undertaking, its related activities, and the environment surrounding the proposed undertaking (refer to Appendix C for definition of environment).

When preparing the registration document the proponent also needs to address the factors relevant to the Minister's decision. Under Section 12 of the Environmental Assessment

Regulations, the Minister must consider the following information when making a decision:

- the location of the proposed undertaking and the nature and sensitivity of the surrounding area;
- the size and scope of the proposed undertaking;
- concerns expressed by the public about the adverse effects or the environmental effects of the proposed undertaking;
- steps taken by the proponent to address environmental concerns expressed by the public;
- potential and known adverse effects or environmental effects of the technology to be used in the proposed undertaking;
- project schedules where applicable;
- planned or existing land use in the area of the undertaking;
- other undertakings in the area; and
- such other information as the Minister may require.

Other Information to Consider

Should an undertaking also require an environmental assessment under federal or another provincial jurisdiction, the process and the minimum requirements listed in the Environmental Assessment Regulations may differ from the information contained in this guide. The proponent should contact the EA Branch and the appropriate jurisdiction(s) early in project planning stages to determine if such changes may apply.

Proponents should contact the EA Administrator prior to registration to confirm the number of copies of the registration document that will be required. Typically, the EA Branch will require between 25 and 35 copies, depending on the project. Double-sided copies are preferred. Electronic copies of the registration document are required to be submitted in Adobe Portable Document Format (PDF) for publication on the EA Branch website. For more information, please contact the EA Branch or visit the EA Branch website (Appendix B) to obtain a copy of the Information Bulletin, *Requirements for Submitting Electronic Copies of Environmental Assessment Documents*.

Effective April 1, 2002, fees will be applied to the registration of all undertakings required to undergo environmental assessment. The amount depends on the type of assessment. The fee for pit and quarry projects is $8,400. Contact the EA Branch (Appendix B) for more information.

Guide Introduction

The following guide provides the suggested format for the registration document and a detailed description of what information should be included in the document. If proponents do not follow the guide format, they must submit a concordance table to show that all requirements have been met.

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1. PROPONENT DESCRIPTION

Provide the name and contact information of the proponent. If the proponent is a corporate body, provide proof of incorporation that is recognized in Nova Scotia.

> The proponent is any person who carries out or proposes to carry out an undertaking, or is the owner or person having care, management or control of an undertaking.

Name of the Proponent:
Mailing Address:
Street Address:
Telephone Number:
Fax Number:
E-Mail Address (if available):
Website (if available):

Include the name, address and signature of the Company President/Chief Executive Officer (CEO), indicating acceptance of the contents of the registration document, and the contact person for purposes of the environmental assessment, as indicated below.

Company President or Chief Executive Officer	**Contact Person for Purposes of Environmental Assessment**
Name: Official Title: Address: (if different from proponent address) Telephone Number: Fax Number: E-Mail Address:	Name: Official Title: Address: (if different from proponent address) Telephone Number: Fax Number: E-Mail Address:

If the contact person for the purpose of the environmental assessment is unable to get the Company President or CEO's signature, the proponent must submit a letter from either the President or the CEO stating that the contact person has signing authority for purposes of the environmental assessment.

This section should also discuss any previous experience the proponent has with pit or quarry developments.

2. THE UNDERTAKING

2.1 Name

Clearly indicate the name of the undertaking.

2.2 Location

Provide a brief description of the location of the undertaking and show its location on maps at regional and local scales, with the Universal Transverse Mercator (UTM) grid and the UTM coordinates showing the centre of the site.

3. SCOPE

It is the responsibility of the proponent to accurately determine the scope of the undertaking and the environmental assessment. The proponent should discuss the scope with the EA Branch prior to starting any work on the environmental assessment.

3.1 Scope of the Undertaking

This section should broadly identify the extent of the proposed undertaking in terms of both time and space. This may include, but is not limited to, the following:

- the depth and area of the proposed pit or quarry,
- all on-site project related facilities and activities (e.g. stockpiling or crushing),
- location of all off-site project-related facilities and activities (e.g. off-site crushing facilities or transportation routes)
- planned production rate for the pit or quarry (e.g. tonnes/year)
- time lines for all phases of the project (including preparation, construction, operation, decommissioning, and reclamation)

3.1.1 Purpose and Need for the Undertaking

Identify the main function of the undertaking. Explain what is to be achieved by carrying out the undertaking, the opportunity the undertaking is intending to satisfy, and who will benefit from the undertaking.

3.1.2 Consideration of Alternatives

Describe other methods of carrying out the undertaking in each phase of the project and provide reasons for the selection of the proposed method(s). Examples include alternate sites, alternative extraction methods, alternative technologies for wastewater treatment, alternative transportation modes and routes, other reclamation and decommissioning options, etc.

3.2 Scope of the Environmental Assessment

The proponent is also responsible for determining the scope of the environmental assessment for a Class I undertaking. Scoping establishes the boundaries of the environmental assessment and focusses the assessment on relevant issues and concerns. The scope of the environmental assessment will vary from project to project but is determined through considering the project description, the expectations of stakeholders, the potential environmental effects that are likely to be adverse following mitigation, and the mitigation measures, among other factors.

The proponent must determine what valued environmental components will be considered in the document. This is discussed further in section 6 on Valued Environmental Components.

4. PUBLIC INVOLVEMENT

For Class I undertakings such as pit and quarry developments, proponents are not required to involve the public beyond the official notification through two newspaper advertisements (one with circulation in the vicinity of the undertaking and one with province-wide circulation). However, when making a decision on the proposed undertaking the Minister will consider all public input about the proposed undertaking, whether positive or negative, including concerns about the adverse effects or the environmental effects of the proposed undertaking and the steps taken by the proponent to address those concerns. It is within the proponent's discretion, and encouraged by the NSDEL, to proactively work with the public to address any concerns prior to registering the undertaking in the EA process. When deciding to involve the public, the proponent should consider identifying and contacting local community representatives, government representatives (municipal, provincial and federal), First Nations, and other stakeholders who may have an interest in the proposed undertaking.

4.1 Methods of Involvement

Provide a description of the public information program(s) initiated. Identify the methods used to notify the general public and stakeholder groups, the number of people contacted, and the number of people that responded. Also, provide copies of the information and materials distributed to the public. NSDEL's *Guidelines for the Formation of a Community Liaison Committee* is a useful resource.

The proponent should describe the opportunities that have been or will be provided to allow the public and stakeholder groups to express their concerns and receive information on the various phases of project development including planning, design, environmental assessment review, construction, operation, decommissioning and reclamation.

4.2 Public Comments

Include all comments brought to the attention of the proponent, both written and verbal, during the public information program(s).

4.3 Steps Taken to Address Public Concerns

The proponent should describe how the public and stakeholder groups' comments were addressed during and following the public information program(s), including any commitments made by the proponent. Anticipated public concerns can be addressed as well.

5. DESCRIPTION OF THE UNDERTAKING

This section of the document should describe the project as it is planned to proceed through the site preparation and construction, operation and maintenance, decommissioning, and reclamation stages of the pit or quarry development.

5.1 Geographical Location

The proponent should identify the site location and its relation to existing communities, transportation facilities, the proposed routes of access, water supplies, etc. Provide a description of the proposed pit or quarry site and show the ultimate boundaries of the site in a regional and local context. Site plans should be submitted to show the location of the major components of the proposed pit or quarry.

A property map should be provided, including the Property Identification Number(s) (PID), large-scale original base map(s) (1:10,000 - 1:12,500 scale preferred), and recent air photos.

5.2 Physical Components

Indicate the major physical components of the undertaking, the site, and adjacent areas such as, but not limited to, bulk loadout facilities, fuel storage, dangerous goods storage, pipelines, transmission lines, port facilities, railways, topsoil and overburden piles, secondary containment, crushing, retention and settling ponds, stockpiles, and roadways.

Discuss the proximity to affected communities, including the number of residences within intervals of 500 m, 1 km, 1.5 km and 2 km of the proposed undertaking.

A scaled site map of the main project components should be provided, indicating proximity to protected and conservation areas within provincial, federal, and municipal jurisdictions (e.g. provincial wilderness areas, provincial parks, sites of ecological significance, and nature reserves; federal migratory bird sanctuaries and wildlife management areas; and municipal protected water supply areas, etc.)

5.3 Site Preparation and Construction

Provide a detailed description of the proposed construction activities, location, techniques, and schedules that will be used. Also, identify the size of the area affected by each respective activity. The proponent should consider addressing, but not be limited to, the following construction activities:

- site orientation
- cut and fill activities
- drilling and blasting
- stripping of vegetation
- clearing and grubbing
- topsoil and overburden storage areas (location and dimensions)
- separation distances (including from public or common highways, watercourses, blasting and property boundary)
- scales, wash pads, lay-down and stockpile areas
- sedimentation ponds and drainage ditches (including capacity)
- site access roads (including gradient) and public roadways
- sewage treatment and waste management systems
- dangerous goods storage areas
- stream crossings, stream diversions, lake dewatering

- structures (e.g. offices and warehouses)
- utilities
- erosion and sedimentation control
- risk management (e.g. contingency plans for uncontrolled release of substances, emergency response plans)
- visual impact management (e.g. landscaping, screening mounds and plantings, use of existing features, photographic records).

5.4 Operation and Maintenance

Provide a detailed description of the proposed activities, locations, techniques, and schedules during the operational phase of the undertaking. Also, calculate amounts of material expected to be handled in the proposed activity where appropriate. The proponent should consider including, but not be limited to, the following:

- drilling and blasting (frequency and size, pre-blast surveys, weather condition considerations)
- crushing, screening and washing
- equipment (including any dust and noise suppression equipment additions or equipment enclosures)
- stockpiling
- water management (surface water, groundwater, stormwater, withdrawal, drainage, erosion and sediment control, acid drainage, water recycling opportunities, ability of the water source to meet requirements taking into consideration those of other users in the vicinity)
- waste management (overburden, management of acid-generating rock [as applicable], sediment management, management of ammonia from blasting activities)
- chemical use (e.g. biocides to kill bacteria or bleaching agents)
- hazardous waste management (e.g fuels, lubricants, hydraulic oil, cement, wet cement, concrete additives and agents, asphalt, paints, solvents, de-icing agents, preservatives)
- wastewater treatment and effluents (location of discharge, volume, quality, monitoring and requirements to meet)
- transportation (modes, routes, load size and frequency, maintenance, refuelling, load coverings, speed restrictions, tire cleaning)
- noise management (e.g. sound berms)
- dust control (e.g. road wetting [including water source], calcium chloride)
- viewscape protection (e.g. tree screens, buffer zones)
- utilities
- risk management (contingency plans for uncontrolled release of substances,

clean-up materials, emergency response plans).

5.5 Decommissioning and Reclamation

The proponent should provide a decommissioning and reclamation plan which details the immediate plans for pit or quarry reclamation as operations advance (progressive reclamation), plans for decommissioning the operation (removal of equipment and structures), and the long-term objective for future use of the property following decommissioning. Reclamation should include all exploration boreholes and testpits. Short-term reclamation options include sloping, seeding, planting of native species, and fertilizing. Long-term options include managing the area for agricultural purposes, timber production, artificial water body or wetland, wildlife habitat, recreational use (e.g. hiking trails or golf course), etc. There should be a commitment to develop a future detailed reclamation plan for the entire site, including which organization and individual would be involved. Details should be provided on plans for monitoring and maintaining reclamation efforts to ensure success.

6. VALUED ENVIRONMENTAL COMPONENTS AND EFFECTS MANAGEMENT

Within the Nova Scotia Environmental Assessment Regulations, Valued Environmental Components (VECs) are interpreted as environmental, socio-economic, human health, reasonable enjoyment of life and property, cultural, historical, archaeological, paleontological and architectural features that may be impacted, whether positive or negative, inside or outside the Province, by the proposed undertaking.

The EA registration document should include information on existing environmental conditions, identified VECs, predicted environmental effects, proposed mitigation, and proposed monitoring programs for the undertaking.

Description of Existing Environmental Conditions and VEC Identification
All elements included in the definitions of "environmental effect" and "adverse effect" in the Environmental Assessment Regulations should be considered when identifying VECs. Provide a description of the existing baseline environmental conditions in the area of the proposed undertaking and indicate how the VECs were identified. Baseline conditions are established through studies which include but are not limited to flora and

fauna, fish and fish habitat, groundwater, surface water, well water, and archeology. Provide the name and credentials of the person(s) conducting the studies.

Predicted Environmental Effects
Identify the predicted environmental effects of all phases of the project on the identified VECs. A qualified person should determine these effects, and the methodology used to predict and support these predictions should also be provided. If there are no predicted effects to a specific feature, provide reasons to support that claim.

Proposed Mitigation
Proponents are encouraged to avoid all predicted negative environmental effects during all phases of the project and to adequately describe how they will be avoided. If the effects cannot be avoided, describe how they will be minimized and controlled through proposed mitigation during construction, operation, decommissioning, and reclamation of the undertaking. Mitigation may also include restitution for any damages to the environment through replacement, restoration, or compensation if the effects cannot be minimized and controlled through other forms of mitigation.

Proposed Monitoring Programs
Monitoring programs proposed by the proponent must be designed to verify the predicted effects and to determine the effectiveness of the proposed mitigation. Environmental effects monitoring may also be required, depending on predicted effects. Further compliance monitoring programs may also be requested by several regulatory authorities if the undertaking is approved.

Environmental Components
The biophysical, socio-economic and cultural/heritage components of the "environment" described in the following sections are those typically encountered in pit and quarry developments and will likely be considered by government departments and agencies when reviewing the registration document. The components identified are likely to vary from project to project, and there may be others not included in these guidelines that the proponent should recognize as being important.

In instances where the proponent predicts that no impacts to an environmental component will exist within the proposed pit or quarry development site, the proponent must clearly explain why. This proactive approach will help ensure the proponent is not asked at a later date to provide that detail. A letter from an appropriate government department or agency agreeing with that prediction would be useful information to the EA Branch. The letter should be included in an appendix of the registration document.

6.1 Biophysical Environment

6.1.1 Geology

Provide a general description of the geological features of the pit or quarry site including the surficial geology (e.g. soil types, permeability, porosity, risk of erosion, etc.) and bedrock geology (e.g. acid producing/consuming rocks, sulphides, carbonates, host rock, etc.) as it relates to the undertaking. If acid slates are present, additional information will be required to determine if the material is net acid producing/consuming. The most current geological maps and stratigraphic terminology must be used when describing the site geology. The geological maps should be included in the registration document.

Discuss the predicted effects (with rationale) on the identified geological formations and how those effects will be avoided or minimized. Discuss how these effects will be monitored, if required.

6.1.2 Surface Water

Provide a general description of the hydrological conditions and water quantity and quality for all surface waters in the vicinity of the pit or quarry development.

Discuss and quantify the predicted effects (with rationale) the pit or quarry may have on existing surface water, both on-site and downstream (e.g. water course alterations, release of effluent, sedimentation). Refer to NSDEL's *Pit and Quarry Guidelines* (revised 1999) for guidance on liquid effluent discharge levels. Describe the proposed methods to avoid or mitigate such effects and any monitoring programs that will be designed to provide information on the effects on surface water.

6.1.3 Groundwater

Provide a pre-development well water survey to establish baseline well water quality and quantity. Provide a general description of the hydrological conditions and water quality and quantity for all groundwater supplies that may be impacted by the pit or quarry development. Include detail on the type, depth, number and location of all wells that may be impacted by the pit or quarry development.

Discuss how the pit or quarry development may impact surrounding groundwater aquifers (e.g. groundwater draw-down) and provide detail on how the impacts to groundwater will be avoided or mitigated. Modelling work may be required to predict these impacts. Describe any monitoring programs, including sampling protocol and monitoring station locations, that will be designed to provide information on effects on groundwater quality and quantity.

6.1.4 Wetlands

Identify the location, size and class of any wetland on-site or downstream that may be impacted by the pit or quarry development. Evaluation of the wetlands should include the following aspects: wildlife habitat potential (including rare and endangered species), groundwater recharge potential, the role of the wetland in surface flow regulation (stormwater retention and flood control), and the potential role of the wetland in water treatment.

Predict the effects (with rationale) to all identified wetlands and provide information on how avoidance or mitigation will be used to preserve the ecological and hydrological integrity of the wetlands. Discuss any proposed monitoring of the identified wetlands, if required.

6.1.5 Flora and Fauna Species and Habitat

Qualified professionals (biologist, botanists, etc.) should be hired by the proponent to conduct a survey to identify flora and fauna species that exist, including any species at risk that may exist throughout the pit or quarry site and throughout any other areas which may be impacted by the development. Botanical and wildlife surveys should be conducted at the site during the appropriate growing or breeding season. If a predictive model is used, it should be supported by cited references.

The Wildlife Division of the Nova Scotia Department of Natural Resources has an online database with the population status of several flora and fauna taxonomic groups throughout Nova Scotia (http://www.gov.ns.ca/natr/wildlife/genstatus/ranks.asp). As well, species at risk are identified in the *Endangered Species Act* of Nova Scotia. This information will be considered by DNR Wildlife staff when reviewing an EA registration document. Also, refer to the federal *Migratory Birds Convention Act* (MBCA) when dealing with these issues.

The Nova Scotia Museum of Natural History has records dating over 100 years old that are sources of information on significant habitat and species at risk. In addition to verified distributional data, the Nova Scotia Museum of Natural History maintains supplementary data on populations or species suites that are significant at a local level. Access to this information can be made by contacting the Heritage Stewardship Section, Heritage Division, Department of Tourism and Culture.

Any significant wildlife habitat, including areas with high wildlife concentrations and wildlife corridors that may exist within the boundaries of the development, should be identified. DNR Wildlife's regional biologists can be contacted for general information but will only release site specific information to the landowner or their agent. If the proponent is not the landowner, they must get written permission from the landowner to receive this information. Significant habitat data relative to endangered species can also be obtained from the Atlantic Canada Conservation Data Centre (Appendix B).

The proponent should identify all protected/conservation areas of provincial, federal, and municipal jurisdictions (e.g. provincial wilderness areas, provincial parks, sites of ecological significance, and nature reserves; federal migratory bird sanctuaries and wildlife management areas; and municipal protected water supply areas, etc.) in the vicinity of the undertaking.

After identifying flora and fauna species and habitat, and any protected and/or conservation areas, discuss the predicted effects (with rationale) that the pit or quarry development may have on all identified features within and outside the immediate footprint of the development, and provide detail on the methods used to avoid or mitigate the predicted effects. Describe any monitoring programs that will be designed to provide information on impacts to flora and fauna species and habitat and protected/conservation areas to determine the success of the mitigation.

The following government departments and agencies are responsible for the management of wildlife species in Nova Scotia:

Federal:

- Canadian Wildlife Service of Environment Canada (responsible for all migratory birds and for all wildlife on federally owned land)
- Fisheries and Oceans Canada (responsible for all fish and fish habitat in Nova Scotia)

Provincial:

- Department of Natural Resources, Wildlife Division (responsible for all other wildlife species in Nova Scotia)

6.1.6 Fish and Fish Habitat

The principles and information sources that apply to flora and fauna species and habitat (see 6.1.5) also apply to fish and fish habitat (where appropriate).

Fisheries and Oceans Canada (DFO) will be reviewing the registration document to determine if the pit or quarry development will likely result in the harmful alteration, disruption, or destruction of fish habitat. A qualified professional should be hired by the proponent to determine whether any fish or fish habitat exists in any identified watercourse within the pit or quarry site or any other receiving watercourse that may be impacted by the development. The appropriate survey(s) should be conducted in a manner that is acceptable to DFO (Appendix A and B).

6.1.7 Atmospheric Conditions / Air Quality

Discuss how dust from blasting, trucking, etc., and other air emissions will affect the existing atmospheric conditions and what will be done to avoid or mitigate negative impacts. Describe any monitoring programs that will be designed to provide information regarding effects on air quality and the success of mitigation measures employed.

6.1.8 Noise Levels

Discuss the predicted effects (with rationale) that increased noise levels from blasting, crushing activity, equipment operation, trucking, etc., will have on wildlife and residents near the pit or quarry development. Include the decibel ratings for all machinery to be used at the mine. Please contact the EA Branch to obtain a copy of the *NSDEL Guideline for Environmental Noise Measurement and Assessment* (Appendix B).

Include the methods to be used that will help avoid or mitigate an increase in noise. Discuss the methods to be used to monitor noise levels throughout the life of the development.

6.2 Socio-Economic Conditions

6.2.1 Economy

Describe the economic conditions for the region and surrounding communities. Information should be provided on the available labour supply and rates of employment for the region and surrounding communities. Provide detail on the number of full and part-time jobs during the construction, operation, decommissioning and reclamation phases of the undertaking. Specify whether these will be new jobs or existing jobs which will be maintained.

Predict the positive and negative effects (with rationale) that the proposed pit

and quarry development will have on the economy. Discuss how any negative impacts to the economy will be avoided or mitigated.

6.2.2 Land Use and Value

Identify the past land use(s) of the site and describe any potential contamination that may have resulted from that land use. Any pre-existing pit and quarry workings should be described. Describe the planned and existing land uses (e.g. industrial, commercial, residential, agricultural, forestry, etc.) within the pit or quarry site and any other area that may be impacted by the proposed pit or quarry development.

Describe the predicted impacts (with rationale) that the proposed pit or quarry development will have on the existing and planned land uses (e.g. property values, land use conflicts, architecture) and the potential for impacts to existing structures (e.g. building foundations, wells, etc.) caused by blasting (if applicable), etc. Discuss the methods that will be used to avoid or mitigate impacts to land uses and existing structures. Discuss plans to conduct a pre-blast survey prior to any blasting activities. Please contact the EA Branch (Appendix B) to obtain a copy of the *NSDEL Procedure for Conducting a Pre-Blast Survey*.

6.2.3 Transportation

Describe the existing conditions of the proposed modes and routes of transportation (e.g. provincial highways, arterial highways, on-site access roads, etc.) that will be used throughout the pit or quarry development. Include information on the existing types and volumes of traffic. Describe the areas through which trucks will travel (e.g. residential or school areas).

Discuss the predicted impacts (with rationale) to traffic volumes and road conditions. Include the proposed methods for avoiding or mitigating impacts to the existing transportation infrastructure.

6.2.4 Recreation and Tourism

Discuss the existing and planned recreation and tourism activities (e.g. hunting, fishing, hiking, parks) for the surrounding area.

Describe the predicted effects (with rationale) the pit or quarry development will have on recreation and tourism and how those effects will be avoided or mitigated. Include a discussion of the impacts of the pit or quarry operation on

the landscape aesthetics and viewplanes.

6.2.5 Human Health

According to the Environmental Assessment Regulations, an environmental effect in respect of an undertaking includes an effect on environmental health, which is defined as those aspects of human health that are or can be affected by contaminants or changes in the environment.

Discuss the predicted effects (with rationale) that the undertaking will have on the health of people in the surrounding area and what will be done to avoid or mitigate any negative impacts.

6.3 Cultural and Heritage Resources

Notify the Heritage Stewardship Section, Heritage Division, Department of Tourism and Culture, of the proposed pit or quarry development so that any areas of historical, archaeological or paleontological importance can be identified. Preliminary information and advice regarding the likelihood of archeological, historical, or paleontological (fossil) remains can be obtained through the Heritage Stewardship Section. Proponents should refer to the *Special Places Protection Act* if any of the above areas are identified. If it is determined that areas of historical, archaeological or paleontological importance may exist, site investigations should be conducted in a manner that is acceptable to the Heritage Stewardship Section, Heritage Division, Department of Tourism and Culture, including obtaining the necessary permits. If any artifacts are discovered during a site investigation, notify the Nova Scotia Museum and the Executive Director of either the Confederacy of Mainland Mi'kmaq or the Union of Nova Scotia Indians (Appendix B), depending on the location of the development.

If it has been determined that areas of historical, archaeological and paleontological importance may exist, qualified professionals should be hired by the proponent to conduct a survey to identify cultural and heritage resources and predict the impacts that the pit or quarry development may have on all cultural and heritage resources identified. Describe the proposed mitigation measures to preserve, protect, or recover these resources.

6.4 Other Undertakings in the Area

Indicate the type, size, location and any other relevant information of other undertakings or developments in the area of the proposed pit or quarry.

Describe the predicted effects (with rationale) that the proposed pit or quarry

development will have on other undertakings in the area, including any effects that are cumulative in nature (e.g. water withdrawal, additional trucking traffic, etc.). Discuss how the predicted negative effects to other undertakings and the environment in general will be avoided or mitigated.

7. EFFECTS OF THE UNDERTAKING ON THE ENVIRONMENT

This section should present an evaluation and summary of the benefits and drawbacks to the environment, including the VECs, during the construction, operation, decommissioning and reclamation stages of the undertaking.

8. EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

Provide a description of the predicted effects the environment may have on the proposed undertaking. Environmental factors that may impact a pit or quarry include climate and meteorological conditions. For example, precipitation levels will affect the volume of runoff.

9. OTHER APPROVALS REQUIRED

It is the proponent's responsibility to identify any other approvals (provincial, federal and municipal) required for the proposed project. List the other permits, licences, approvals, and other forms of authorization required for the undertaking to proceed, together with the names of the authorities responsible for issuing them (e.g. federal, provincial and municipal government departments).

10. FUNDING

Identify any public source of funding that will be used to finance any part of the undertaking. Include the contact information for any government department or agency from which the funds have been requested.

11. ADDITIONAL INFORMATION

The proponent is encouraged to include any other information they believe is necessary or relevant for the environmental assessment.

APPENDIX A
REFERENCE DOCUMENTS

DFO. *Standard Methods Guide for Fish and Fish Habitat Surveys in Newfoundland and Labrador: Rivers & Streams.*

Nova Scotia Department of Environment. *Pit and Quarry Guidelines.* Revised 1999.

Nova Scotia Department of Environment and Labour. *Fee Schedule for Environmental Assessment.*

Nova Scotia Department of Environment and Labour. *Proponent's Guide to Environmental Assessment.*

Nova Scotia Department of Environment and Labour. *Requirements for Submitting Electronic Copies of Environmental Assessment Documents.*

Nova Scotia Department of Environment and Labour. *Regulatory Time Frames for Environmental Assessment.*

Nova Scotia Department of Environment and Labour. *Nova Scotia Wetlands Directive.*

APPENDIX B
CONTACT INFORMATION

Nova Scotia Department of Environment and Labour
Environmental Assessment Branch
5151 Terminal Road, 5th Floor
PO Box 697
Halifax, NS
B3J 2T8
Phone: (902) 424-2574
Fax: (902) 424-3571
Email: EA@gov.ns.ca
Website: www.gov.ns.ca/enla/ess/ea

Nova Scotia Department of Natural Resources
Wildlife Division
Provincial Building
136 Exhibition Street
Kentville, NS
B4N 4E5
Phone: (902) 679-6091
Fax: (902) 679-6176
Website: www.gov.ns.ca/natr/wildlife

Nova Scotia Department of Tourism and Culture
Heritage Stewardship Section
Heritage Division
1747 Summer Street
Halifax, NS
B3H 3A6
Phone: (902) 424-7370
Fax: (902) 424-0560
Website: http://museum.gov.ns.ca/mnh/

Atlantic Canada Conservation Data Centre
PO Box 6416
Sackville, NB
E4L 1G6
Fax: (506) 364-2656
Website: www.accdc.com

Canadian Environmental Assessment Agency - Atlantic Region
1801 Hollis Street
Suite 200
Halifax, NS
B3J 3N4
Phone: (902) 426-0564
Fax: (902) 426-6550
Website: http://www.ceaa-acee.gc.ca/

Fisheries and Oceans Canada (DFO)
Habitat Management Division
1 Challenger Dr., 5th Floor Polaris, BIO
PO Box 1006
Dartmouth, NS
B2Y 4A2
Phone: (902) 426-8015
Fax: (902) 426-1489
Email: info@dfo-mpo.gc.ca
Website: http://www.dfo-mpo.gc.ca

Environment Canada
Canadian Wildlife Service
PO Box 6227
17 Waterfowl Lane
Sackville, NB
E4L 1G6
Phone: (506) 364-5044
Fax: (506) 364-5062
Email: nature@ec.gc.ca
Website: http://www.cws-scf.ec.gc.ca/

The Confederacy of Mainland Mi'kmaq
Executive Director
Millbrook Multi-Purpose Centre
57 Martin Cresent
Millbrook Mi'gmaq Native Community
PO Box 1590
Truro, NS
B2N 5V3
Phone: (902) 895-6385
Fax: (902) 893-1520
Website: http://www.cmm-ns.com/

Union of Nova Scotia Indians
Executive Director
PO Box 961
Sydney, NS
B1P 6J4
Phone: (902) 539-4107
Fax: (902) 564-2137
Website: http://www.unsi.ns.ca/
Email: rec@unsi.ns.ca

APPENDIX C
DEFINITIONS

Please refer to the *Environment Act*, the Environmental Assessment Regulations and the *Mineral Resources Act* for complete definitions.

Adverse Effect
An effect that impairs or damages the environment, including an adverse effect respecting the health of humans or the reasonable enjoyment of life or property.

Aggregate
All consolidated and unconsolidated material, excluding gypsum, limestone, peat or minerals as defined under the *Mineral Resources Act*.

Environment
The components of the earth, including

(i) air, land and water,

(ii) the layers of the atmosphere,

(iii) organic and inorganic matter and living organisms,

(iv) the interacting natural systems that include components referred to in subclauses (i) to (iii), and

(v) for the purpose of Part IV of the Environment Act, the socio-economic, environmental health, cultural and other items referred to in the definition of environmental effect.

Environmental Assessment
A process by which the environmental effects of an undertaking are predicted and evaluated and a subsequent decision is made on the acceptability of the undertaking.

Environmental Effect
In respect of an undertaking,

(i) any change, whether negative or positive, that the undertaking may cause in the environment, including any effect in socio-economic conditions, on environmental health, physical and cultural heritage or on any structure, site or thing including those of historical, archaeological, paleontological or architectural significance, and

(ii) any change to the undertaking that may be caused by the environment, whether the change occurs inside or outside the Province.

Extension
An increase in size, volume or other dimension of an undertaking such that the increase may cause adverse effects or significant environmental effects if not properly mitigated.

Groundwater
All water naturally occurring under the surface of the Province.

Mitigation
With respect to an undertaking, the elimination, reduction or control of the adverse effects or the significant environmental effects of the undertaking, and may include restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

Modification
A change to an undertaking that may cause adverse effects or significant environmental effects if not properly mitigated and includes, but is not limited to, the expansion of the same process, addition of product lines and replacement of equipment with different technology other than that presently in use.

Pit
An excavation made for the purpose of removing aggregate without the use of explosive.

Processing
The treatment of a mineral or mineral-bearing substance beyond primary crushing and includes secondary crushing, grinding, concentrating, chemical extraction, smelting, refining and packaging.

Production
The winning, taking or carrying away for sale or exchange of a mineral, mineral-bearing substance, gypsum, limestone, sand, sandstone, topsoil, aggregate, rock, tailings or any product thereof, except for the purpose of assaying, sampling or metallurgical testing.

Proponent
A person who

(i) carries out or proposes to carry out an undertaking or activity, or

(ii) is the owner or person having care, management or control of an undertaking or activity.

Quarry
An excavation requiring the use of explosives made for the purpose of removing consolidated rock from the environment.

Significant
With respect to an environmental effect, an adverse impact in the context of its magnitude, geographic extent, duration, frequency, degree of reversibility, possibility of occurrence or any combination of the foregoing.

Undertaking
An enterprise, activity, project, structure, work or proposal and may include, in the opinion of

the Minister, a policy, plan or program that has an adverse effect or an environmental effect and may include, in the opinion of the Minister, a modification, extension, abandonment, demolition or rehabilitation, as the case may be, of an undertaking.

Valued Environmental Component
A valued environmental component (VEC) is a resource or environmental feature that is important (not only economically) to a local human population, or has a national or international profile, or if altered from its existing status, will be important for the evaluation of environmental impacts of industrial developments.

Watercourse
(i) the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and

(ii) all ground water.

Wetland
Lands commonly referred to as marshes, swamps, fens, bogs, and shallow water areas that are saturated with water long enough to promote wetland or aquatic processes which are indicated by poorly drained soil, vegetation and various kinds of biological activity which are adapted to a wet environment.

APPENDIX D
PIT AND QUARRY GUIDELINES

Nova Scotia Department of the Environment
Pit & Quarry Guidelines
Revised May 1999.

Note: This is a transcribed copy of the original guidelines. Where there is a discrepancy between this documents and the 1999 Guidelines, the 1999 Guidelines will prevail.

I. Definitions

Abandonment	Means cessation of production of aggregate for a period of 12 months.
Active Area	Active area shall be considered the area required to operate a pit or quarry. This includes the site "working face" and associated works.
Administrator	Means a person appointed by the Minister, and includes an acting administrator.
Aggregate	Is all consolidated and unconsolidated material excluding gypsum, limestone, peat or minerals as defined under the *Mineral Resources Act*.
Associated Works	Means any building, structure, processing facility, pollution abatement system or stockpiles of aggregate.
Department	The Nova Scotia Department of the Environment
Disturbed Area	Any area on a pit or quarry site that has been stripped of vegetation and is susceptible to erosion
Liquid Effluents	Storm run-off, wash water, or any other liquid waste
Minister	The Honourable Minister of the Environment for the Province of Nova Scotia
Pit	An excavation made for the purpose of removing aggregate without the use of explosive
Quarry	An excavation, requiring the use of explosives, made for the purpose of removing consolidated rock from the environment

Rehabilitation	Restorative work performed or to be performed in accordance with the approved rehabilitation plan
Rehabilitation Plan	Is a written plan approved by the Department to provide for partial or total abandonment of the pit or quarry and may include an initial rehabilitation plan, progressive rehabilitation or a final rehabilitation plan.
Scrap	All waste material including rejected metal, lumber, and tree stumps.
Watercourse	Is the bed and shore of every river, stream, lake, creek, pond, spring, lagoon, or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and all ground water.

II. Application

(1) These guidelines apply to all pit and quarry operations as defined under Division V part 2 (e) and (f) of the Activities Designation Regulations.

(2) Not withstanding subsection II(1), an approval is not required in relation to
(a) pit and quarry operations, where aggregate is utilized for public purposes by or for the Department of Transportation & Public Works;
(b) land being cut for road or highway construction; or
(c) where the primary purpose of aggregate removal is for development and not for aggregate production.

(3) With respect to operations noted in II(2)(a) the Department of Transportation & Public Works shall ensure these operations adhere to these guidelines. However, the Department of the Environment will have the final authority on any matter relating to interpretation and enforcement.

III. Separation Distances for Pit Operations

(1) No person responsible for the operation of a pit shall locate the active area within:
(a) 30 m of the boundary of a public or common highway unless the person has consent from the Department of Transportation and Public Works to operate closer;
(b) 30 m of the bank of any watercourse or ordinary high water mark;
(c) 30 m of the boundary of the pit property;

(2) No person responsible for the operation of a pit shall locate the excavation "working face" of the pit within:

(a) 30 m of the boundary of a public or common highway unless the person has consent for the Department of Transportation and Public Works;
(b) 30 m of the bank of any watercourse or ordinary high water mark;
(c) 90 m of the foundation or base of a structure located off site. Structure includes but is not limited to a private home, a cottage, an apartment building, a school, a church, a commercial building, or a treatment facility associated with the treatment of municipal sewage, industrial or landfill effluent, an industrial building or structure, a hospital, and a nursing home, etc.*
(d) 15 m of the property boundary when a structure on the abutting property is not involved.

NOTE:* This distance is measured from the working face of the pit to the foundation or base of the structure. This distance can be reduced with written consent from all individuals owning structures within 90 m.

IV. Separation Distances for Quarry Operations

(1) No person responsible for the operation of a quarry shall locate the associated works within:

(a) 30 m of the boundary of a public or common highway unless the person has written consent from the Department of Transportation and Public Works to operate closer;
(b) 30 m of the bank of any watercourse or the ordinary highwater mark;
(c) 30 m of the boundary of the property on which the quarry is located;

(2) No person responsible for the operation of a quarry shall blast within:

(a) 30 m of the boundary of the public or common highway unless the person has written consent from the Department of Transportation & Public Works;
(b) 30 m of the bank of any watercourse or the ordinary high water mark;
(c) 800 m of the foundation or base of a structure located off site. Structure includes but is not limited to a private home, a cottage, an apartment building, a school, a church, a commercial building, or a treatment facility associated with the treatment of municipal sewage, industrial or landfill effluent, an industrial building or structure, a hospital, nursing home, etc.*
(d) 15 m of the property boundary when a structure on the abutting property is not involved.

NOTE:* The separation distance is measured from the working face and point of blast to the foundation or base of the structure. This distance can be reduced with written consent from all individuals owning structures within 800 m.

V. Liquid Effluent Discharge Levels

(1) All storm run-off from the operating site and all liquid effluents resulting from the operation shall be collected and treated to meet the following suspended solids concentrations prior to discharge into a watercourse or beyond the property boundaries:

(a) Maximum suspended solids concentration in any grab sample - 50 mg/l;

(b) Maximum arithmetic monthly average suspended solids concentration - 25 mg/l;

(2) All wash water systems shall be arranged in closed circuit.

VI. Suspended Particulate Levels

(1) If requested by NSDOE dust emission and particulate matter shall be monitored at a monitoring point located beyond the property boundary of the pit or quarry and shall not exceed the following limits at or beyond the property boundary:

Parameter	Max. Limit
Suspended Particulate Matter	60-70 $\mu g/m^3$ annual geometric mean
	120 $\mu g/m^3$ average concentration over a 24 hr period

(2) Suspended Particulate Matter shall be measured by the High Volume Method as described in Report No. E.P.S. 1-AP-73-2.

(3) Monitoring stations shall be located on the property line of the site being monitored, or at other locations as directed by the Minister, or Administrator.

VII. Sound Level Limits

(1) The following sound level limits shall be observed at the property boundaries of the pit or quarry:

	Leq. Sound Level Limits*	
"Night"	"Evening"	"Day"
55 dBA	60 dBA	65 dBA

Night: 23:00 - 07:00, All Day Sunday and Statutory Holidays
Evening: 19:00 - 23:00 Hours
Day: 07:00 - 19:00 Hours

NOTE:* The equivalent sound level is measured in Terms of dBA. The equivalent sound level, then, takes into account the major factors influencing the effect of noise on man, magnitude, frequency range and time variation.

(2) Monitoring stations shall be located on the property line of the site being monitored or at other locations as directed by the Minister or Administrator.

VIII. Blasting

(1) (a) No person responsible for the operation of a quarry shall permit any blasting on site to exceed the following limits:

Concussion (Air Blast) 128 dBA	Within 7 m of the nearest structure not located on the property where the blasting operations occur, or other locations as directed by the Minister or Administrator.
Ground Vibration: 0.5 in./sec. (12.5 mm/s) Peak Particle Velocity	Measured below grade or less than 1 m above grade in any part of the nearest structure not located on the property where blasting occurs, or other locations as directed by the Minister or Administrator.

1(b) No person shall fail to monitor all blasts for the parameters outlined in VIII(1)(a)

(2) Monitoring results shall be forwarded to the Department on a monthly basis unless otherwise indicated.

(3) No blasting shall occur on Sunday, on statutory a holiday prescribed by the Province, or on any day between the hours of 1800 hours and 0800 hours.

(4) Every person responsible for the operation of a quarry shall have a technical blast design prepared by a qualified person which ensures the ground vibration and air concussion outlined in VIII(1) can be achieved.

(5) Every person responsible for the operation of a quarry shall conduct a pre-blast survey of all structures within 800 m of the point of blast. This survey should be conducted in accordance with the Department of the Environment's "Procedure For Conducting a Pre-Blast Survey".

(6) No blasting is to take place if a thermal inversion is anticipated at the time of the proposed blast.

IX. Rehabilitation

(1) Every person responsible for the operation of a pit or quarry shall

(a) within six (6) months of receiving an approval submit an interim security in amounts outlined in the section titled Security X (3) & (4);

(b) before the expiry of the time period referred to in section X (2) the proponent shall post a final security which shall be calculated using the rehabilitation plan and the factors outlined in section X (5)

(c) within twelve (12) months of abandonment of the pit or quarry the site shall be rehabilitated to the satisfaction of the department an in accordance with an approved rehabilitation plan.

X. Security

(1) Every person responsible for the operation of a pit or quarry shall post a security in accordance with the provision of Section 13 of the Approvals Procedure Regulation and Section 57 of the Environment Act.

(2) The Proponent shall post an interim security in the amounts noted in sections (3) & (4) until a final calculation referred to in section (5) is calculated. The interim security shall not exceed one (1) year unless other wise agreed upon in writing by the Administrator.

(3) The amount of security for a pit shall be $6250.00/ha ($2500.00/acre) of disturbed area.

(4) The amount of security for a quarry shall be $6250.00/ha ($2500.00/acre).

(5) Before the expiry of the interim security, the Proponent shall submit a rehabilitation plan. This rehabilitation plan shall include the estimated total cost for labour, equipment, supplies and services to undertake the following activities:

(i) surface contouring;

(ii) establishing proper drainage;

(iii) revegetation work; or

(iv) any work necessary to reclaim the pit or quarry.

XI. Protection of Groundwater Resources

Prior to any excavation below the watertable a hydrological study will be required and approval must be obtained from the Minister or Administrator.

Dated at Halifax, Nova Scotia, this 4th day of May, 1999.
George Fox, Deputy Minister.